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AGRICULTURAL EDUCATION[1]

THE UNITED STATES DEPARTMENT OF AGRICULTURE

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Historically the movement for agricultural education in the United States dates back to 1785 when associations for the promotion of agriculture began to be formed. A few years later, in 1792, mainly in response to the agitation of these associations, colleges undertook to provide for instruction in agriculture, first Columbia, and then Harvard and Yale.

It was not, however, until 1862 that the real movement for scientific agriculture had its beginning. Congress of this year authorized the establishment of a department of agriculture (1, p. 57),[2] and also passed the Morrill Act giving to each state a grant of land with which to establish a state college of agriculture and mechanic arts (1, pp. 62–64). The Hatch Act of 1887 provided for agricultural experiment stations in each state and territory (1, pp. 64–66), and during the following year the Office of Experiment Stations was created as a separate bureau of the Department to serve as the official head of all the agricultural experiment stations.

On July 1, 1862, the United States Department of Agriculture was organized. Its growth as expressed in terms of people employed and total expenditures may be seen by comparing 29, the number employed the first year with 17,819, the number employed in 1908, and $63,704.21 expended the first year with $13,628,696 expended in 1908. For the last twenty years Congress has provided liberally for the maintenance of the Department. It has been estimated that nearly $100,000,000 has been spent during this time for agricultural research and education, for the most part through the Department. This vast expenditure, of course, would never have been made had it not been justified by results as measured in dollars and cents. In 1908 the agricultural products of our country amounted to $7,778,000,000. The value of the corn crop alone amounted to $1,615,000,000. It may be readily seen that a very slight increase in yield per acre would aggregate many times the running expenses of all the institutions engaged in promoting agriculture. The work of the Department has made possible not only a slight increase but in nearly all kinds of production a very large increase (1, pp. 44–46).

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[1] This is the first of a series of articles on elementary and secondary agricultural education in America, and the various agencies concerned in its promotion.

[2] These references in parentheses refer to the annotated bibliography at the end of the article.

The aim of the Department has been twofold: first, scientific, developing a scientific knowledge of every phase of agriculture; second, educational, conveying this knowledge to all the people. In both these aspects of its work the Department has been closely allied with the land-grant agricultural colleges. Indeed, the Department and the agricultural experiment stations in different states and territories, organized chiefly as departments of land-grant colleges, stand at the head of our system of agricultural research and education.

Since 1889 the Association of American Agricultural Colleges and Experiment Stations has been holding annual meetings. Members of the Department take prominent part in these meetings, and the proceedings are published through the Office of Experiment Stations. The director of this office is chairman and the specialist in agricultural education is secretary. The educational policy of agricultural colleges, such as terms of admission, courses of study, matters of administration, etc., is determined largely by a standing committee of this association known as the "committee on instruction in agriculture." For several years agricultural instruction of collegiate grade has been well organized and on a good working basis. Recently the efforts of this committee have been directed to a consideration of instruction of secondary grade. A course of study has been worked out in considerable detail to serve as a model for schools contemplating such instruction (2, 3). Some attention has also been given to work in elementary schools (4, 16).

The Department is organized into eleven scientific bureaus as follows: weather, animal industry, plant industry, forest service, chemistry, soils, entomology, biological survey, statistics, experimental stations, and public roads. All of these are doing much to encourage and help agricultural education throughout the country. In a general way they reach the people through publications, a great many of which are distributed free (5, 7) while others are for sale at a nominal price (6, 7). Those for free distribution are as a rule written in a popular style, free from technical terms, and are easily understood by the average reader. The series known as "Farmers' Bulletins" contains contributions from all the bureaus and there is scarcely any phase of agriculture that has not received attention. These bulletins are especially useful to elementary and secondary schools giving instruction in agriculture.[3] Many of them dealing with such subjects as birds, insects, tree planting, school gardening, and plant propagation, would be useful in any elementary or high school.

Besides general contributions to agricultural education made by all the bureaus of the Department, certain bureaus are taking an active part in public education.

The weather bureau from its central office at Washington and through its officials at various stations throughout the country is doing much to encourage the study of meteorology.

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[3] The following are suggested for school libraries; for titles see (5): Nos. 22, 24, 28, 32, 34, 35, 42, 44, 47, 49, 51, 52, 54, 55, 59, 61, 62, 63, 64, 66, 74, 77, 80, 81, 85, 86, 91, 99, 101, 104, 106, 112, 113, 121, 126, 127, 128, 131, 134, 142, 154, 155, 157, 165, 166, 170, 172, 173, 177, 181, 182, 185, 187, 188, 192, 194, 195, 196, 98, 199, 200, 201, 203, 205, 213, 218, 220, 228, 229, 235, 236, 241, 242, 245, 248, 253, 254, 266, 270, 272, 282, 283, 285, 287, 289, 293, 295, 297, 298, 303, 306, 313, 315, 324, 327, 336, 339, 340, 346.

> During the school year a million or more children of the public schools make weather observations and study the daily weather maps and forecasts. From its earliest days the Weather Bureau has co-operated to some extent in public-school work, and during the past ten years this co-operation has been widely extended. The public schools and the Weather Bureau have a mutual interest in the matter. The school authorities have found in the study of the weather with the assistance of the Weather Bureau a means of satisfying part of the requirements of modern methods of study; and the Weather Bureau is able through the school gradually to dispell popular superstitions and fallacious beliefs that have hampered its work . . . . and to enable both the commercial and the agricultural world to make more intelligent and more complete use of the forecasts, special warnings, weather maps, and climatological publications (8. p. 267).

About 15 per cent. of the daily issue of weather maps is used in the public schools. Lectures are given by officials of the Weather Bureau at teachers' institutes and elsewhere. The policy of this bureau has been to assist the public schools in every way possible as far as general duties to the public will permit.

The Forest Service is reaching the schools through its publications, lantern slides, and other illustrative material concerning the conservation of the forests of our country. The Forest Service believes that "the public school should treat forestry as one of the important economic and public questions in the life of the world" (9, p. 6), and that forestry should have a prominent place in our education. "Below the secondary school forestry should form part of nature-study, arithmetic, and general geography; in the high school, of United States history, civics, physical geography, commercial geography, botany, agriculture, and wood working" (9, p. 7). One of the recent efforts of the Forest Service to co-operate with the public schools is through phenological studies of our native forest trees. On request the Forest Service will send to any school a set of blanks on which to record observations on such matters as general character of country, situation of trees, character of season, date of swelling of buds, of bursting of buds, of beginning of leafing out, of general leafing out, of blossoming, of change of color in foliage, etc. (dates of fifteen special observations in all).

These blanks are accompanied by a circular giving complete directions for study of trees and making records. This work is of great value not only in encouraging pupils to make a close acquaintance with trees, but also in the reaction that must come to them in feeling that they are materially assisting the government in its work. Similar phenological studies of common flowering plants, have been carried on very successfully for a number of years by the public-school children of Canada under the direction of the Botanical Club of Canada.

The Bureau of Plant Industry has been especially active in promoting the movement for school gardens. At Washington, under direct supervision of the Bureau, experiments in school gardening have been carried on for several years. A part of the government grounds with a green house has been devoted to this work. The Bureau sends to schools throughout the country special packages of vegetable and flower seeds accompanied by circulars containing directions for planting and care of school gardens (10, 11). The Bureau also furnishes sets of

> one hundred samples of seeds of economic and wild plants put up in glass vials, labeled with Latin and common names and arranged in an herbarium tray for reference purposes. The seeds and the work of preparation are furnished by this office free of charge, but it is necessary for those desiring sets to supply the tray and vials used. These can be obtained at a cost of $1.50 from Messrs. Mackall Bros., 9th and H Streets, N. E., of this city [Washington, D. C.] to whom remittances should be made direct with the request that the material be forwarded to this office. At the same time kindly notify us that such remittance has been made.[4]

The following is a good summary of the educational work of the Office of Experiment Stations:

> While the other bureaus of this Department are doing valuable educational work along the lines of research in which they are engaged the Office of Experiment Stations is the general agency of the Department for the promotion of agricultural education throughout the United States and is constantly enlarging the scope and extent of this branch of its work. The educational work of this Office is now organized into two branches, one dealing with agricultural colleges and schools and the other with farmers' institutes and other forms of extension work in agriculture. The

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[4] From circular letter: "Seed Laboratory," Bureau of Plant Industry, United States Department of Agriculture.

> work of the Office relating to agricultural colleges and schools includes four general classes: (1) The collection and publication of information regarding the progress of agricultural education at home and abroad; (2) studies of different grades of American and foreign schools in which agriculture is taught; (3) work in co-operation with the Association of Agricultural Colleges and Experiment Stations and other important associations dealing with educational matters; and (4) the giving aid to agricultural colleges and local school authorities along the lines of agricultural education. This work is in charge of Mr. D. J. Crosby, as specialist in agricultural education.
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> This branch of the Office conducts a department of agricultural education in the Experiment Station Record (13), prepares and publishes statistics, courses of study, circulars of information, and other literature relating to agricultural education, aids state and local school authorities in organizing agricultural courses in schools and colleges and in securing competent teachers, takes part in important agricultural conventions and conferences, aids teachers in securing suitable agricultural literature for their work, and, in short, acts as a clearing-house for agricultural education in this country (12, pp. 7, 8).

The work of the Office dealing with farmers' institutes and extension work is in charge of Professor John Hamilton, farmers' institute specialist. Although all the work undertaken by this branch of the Office has to do with agricultural education as presented to adults, it also reaches the public schools indirectly through correspondence with persons interested in agricultural education, by distributing agricultural literature, by preparing and editing bulletins, illustrated lectures and courses of study for movable schools of agriculture. In the movable schools of agriculture a course is offered for country school teachers including nature-study teaching, school gardens and grounds, and school architecture and sanitation (14, p. 6).

The attitude and interest of the Department toward unifying our educational system, in so far as it concerns agriculture and country life, into a complete system extending from the elementary schools, through the secondary schools, into the colleges and graduate schools has been well expressed by Assistant Secretary Willet M. Hayes in a recent address (15, pp. 4, 5). He says:

> A movement is well begun to organize better, as a part of our great American school system, the secondary schools as to meet especially the

needs of country life. This movement contemplates that, below and leading to our more than 60 state colleges of agriculture already established, we shall have 300 to 400 agricultural finishing schools—practically one in each country congressional district of ten or more counties, either separate or as a strong department of an existing institution. . . .

But vastly more important is the larger movement to establish a system of consolidated rural and village schools, and of courses in agriculture in town and city schools so near the homes of farm youth that something of instruction in agriculture, in home economics, and in social and civil affairs, as well as in the accepted subjects of a so-called general education, shall be taught to all the boys and girls of the farm. To meet this first need the consolidated rural school in the open country and the consolidation of rural schols about the villages and cities is rising rapidly into prominence along with the vocational high school; and many city and non-public schools of secondary and higher grade are seeking to add agricultural instruction to their courses of study. . . .

It is conceded that the large and important task of supplying trained teachers for approximately 30,000 consolidated rural schools in our rich rural communities, for thousands of town and city schools, for 100,000 small rural schools in isolated and sparsely settled communities, for 300 or 400 large agricultural high schools, for 150 state normal schools, and for 60 state colleges of agriculture may be taken up in a practical way and solved in one or two decades. The demand and organization for training teachers going forward together will meet with only the usual pioneering difficulties.

BIBLIOGRAPHY

The following annotated references have been referred to by number on the preceding pages. Directions are given for obtaining these and other publications of the Department. The titles with summary of contents of all publications of the Office of Experiment Stations on agricultural education, corrected to Oct. 1, 1908, are in reference (16).

1. *Historical Sketch of the U. S. Department of Agriculture: Its Objects and Present Organization.* Charles H. Greathouse, Division of Publications, Bul. 3, second revision (1907), pp. 97.

The first part (pp. 5-57) deals with early government aids to agriculture, agricultural division of patent office, organization of the independent department, the department raised to first rank, buildings, bureaus, divisions and offices. The second part gives an account of legislation and a tabulation of expenditures.

2. *Secondary Courses in Agriculture* (seventh report of the Committee on Instruction in Agriculture), Office of Experiment Stations, Cir. 49, pp. 10.

A number of high-school courses are given with suggested changes adapting them to the introduction of agriculture.

3. *A Secondary Course in Agronomy* (eleventh report of the Committee on Instruction in Agriculture), Office of Experiment Stations, Cir. 77, pp. 43.

This report contains a syllabus of agronomy, instructions to teachers and 113 lectures, recitations, demonstrations, and laboratory exercises on various phases of agronomy. The plan is a good one to work to, but is somewhat in advance of, or too advanced for, the average high school.

4. *The Teaching of Agriculture in the Rural Common Schools* (ninth report of the Committee on Instruction in Agriculture), Office of Experiment Stations, Cir. 60, pp. 20.

   This report discussed the development of industrial training in the common schools and gives an outline of work in nature-study, and elementary agriculture for such schools.

5. Publications for free distribution (revised annually), Division of Publications, Cir. 2 (1908), pp. 76.

   This list of publications and copies of all publications which it mentions will be sent free on application to the Secretary of Agriculture, Washington, D. C.

6. Publications for sale (revised annually), Division of Publications, Cir. 3 (1908), pp. 99.

   This list may be obtained in the same way as (5) but applications for publications mentioned in this list must be addressed to the Superintendent of Documents, Government Printing Office, Washington, D. C. Only coin or currency should be sent, as stamps are not accepted.

7. Monthly list of publications, Division of Publications, Monthly Circular, pp. 4.

   This circular will be sent regularly to all who apply for it. Address, Secretary of Agriculture, Washington, D. C. The list contains titles of all new publications, including reprints and revisions, of the Department.

8. *The Weather Bureau and the Public Schools.* JOHN R. WEEKS; reprint from *Yearbook of Department of Agriculture for 1907*, pp. 267–76.

   This reprint contains a discussion of methods of teaching, an outline by grades of meteorology for the elementary schools of the state of New York, the purpose and value of meteorology in school work, weather map and other aids to teachers, home-made apparatus, lantern slides.

9. *Forestry in the Public Schools.* HUGO A. WINKENWERDER, Forest Service, Cir. 130 (1907), pp. 20.

   This circular suggests how various school subjects may be correlated with forestry and gives an outline for such correlation with each subject. It also contains a very complete classified list of references.

10. *The School Garden.* L. C. CORBETT, Bureau of Plant Industry, Special Cir. (1905), pp. 6.

    Brief plans are given for a school garden. Six common vegetables and six common flowering plants are described with cultural directions.

11. *The School Garden.* L. C. CORBETT, Farmers' Bul. 218 (1905), pp. 40.

    This bulletin discusses value of garden work, type of plants for garden, laboratory exercises, studies of soil, plants, roots, stems, leaves, cuttings, budding, window boxes, and decoration of school yard.

12. *The American System of Agricultural Education.* A. C. TRUE AND D. J. CROSBY, Office of Experiment Stations, Cir. 83 (1909), pp. 27.

    Agricultural education in America is discussed briefly as follows: Departments of original research and graduate study in agriculture; agricultural colleges; secondary schools of agriculture; elementary schools; schools for negroes and Indians. Under elementary instruction the work in different parts of the country includes, (1) nature-study with plants, farm crops, domestic animals, and soils; (2) school garden work, including improvement of school grounds; (3) lecture courses and institutes for rural school children; (4) organization of clubs among school children.

13. *Experiment Station Record.* E. W. ALLEN, editor, Office of Experiment Stations.

The *Record* contains numerous abstracts of publications of the agricultural experiment stations and kindred institutions in this and other countries; articles and editorials on topics of special interest in agricultural science by American and foreign experts. One department is devoted entirely to reviews of publications on agricultural education. With the beginning of the current volume (XXI) this serial will be issued in two volumes a year of six numbers each. Subscription, one dollar per volume, payable in advance to the Superintendent of Documents, Government Printing Office, Washington, D. C.

14. *Form of Organization for Movable Schools of Agriculture.* JOHN HAMILTON, Office of Experiment Stations, Cir. 79 (1908), pp. 8.

A plan is proposed to organize movable schools of agriculture for farmers over nineteen years of age and for teachers in rural schools. A course is to extend over three or four seasons. The purpose is to equip several persons in each community "so that they will be able to improve in their locality the branch of agriculture which the school represents."

15. *Education for Country Life.* WILLET M. HAYES, Office of Experiment Stations, Cir. 84 (1909), pp. 40.

This is a reprint of an address given before the Minnesota Educational Association, January 2, 1908. It contains a general discussion of agricultural education, followed by plans for organization of schools for country life, county system of consolidated rural schools, or the farm school, the agricultural high school, and financing consolidated rural schools in Minnesota.

16. List of publications of the Office of Experiment Stations on agricultural education, Office of Experiment Stations, Cir. Oct. 27, 1908, pp. 13.

This comprises 136 publications: 24 circulars, 65 bulletins, 25 separates, 9 lectures, 3 documents. All phases of agricultural education from elementary to graduate instruction are represented. The following are some of the publications relating to elementary schools: Separates, *Boys' Agricultural Clubs, Illustrative Material in Teaching Agriculture in Rural Schools, Training Courses for Teachers of Agriculture;* Bulletins: 160, *School Gardens,* 186, *Exercises in Elementary Agriculture—Plant Production,* 195, *Simple Exercises Illustrating Some Applications of Chemistry to Agriculture;* Circular 52, *Books and Bulletins on Nature-Study, School Gardening, and Elementary Agriculture.*